Practice Problem Set 4 [Two sample tests] Solutions

Question 1

```
Variance ratio test
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       1 |      10       2.169    .5891867    1.863172     .836167    3.501833
       2 |       5       2.876    .6584725    1.472389    1.047787    4.704213
---------+--------------------------------------------------------------------
combined |      15    2.404667     .444975    1.723381     1.45029    3.359043
------------------------------------------------------------------------------
    ratio = sd(1) / sd(2)                                         f =   1.6013
Ho: ratio = 1                                 degrees of freedom =     9, 4

    Ha: ratio < 1               Ha: ratio != 1                 Ha: ratio > 1
  Pr(F < f) = 0.6568         2*Pr(F > f) = 0.6864           Pr(F > f) = 0.3432


Two-sample t test with equal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       1 |      10       2.169    .5891867    1.863172     .836167    3.501833
       2 |       5       2.876    .6584725    1.472389    1.047787    4.704213
---------+--------------------------------------------------------------------
combined |      15    2.404667     .444975    1.723381     1.45029    3.359043
---------+--------------------------------------------------------------------
    diff |              -.707    .9597405               -2.780393    1.366393
------------------------------------------------------------------------------
    diff = mean(1) - mean(2)                                      t =  -0.7367
Ho: diff = 0                                  degrees of freedom =       13

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.2372         Pr(|T| > |t|) = 0.4744          Pr(T > t) = 0.7628


Two-sample Wilcoxon rank-sum (Mann-Whitney) test

        var1 |      obs    rank sum    expected
-------------+---------------------------------
           1 |       10          71          80
           2 |        5          49          40
-------------+---------------------------------
    combined |       15         120         120

unadjusted variance       66.67
adjustment for ties        0.00
                     ----------
adjusted variance         66.67

Ho: var2(var1==1) = var2(var1==2)
            z =  -1.102
    Prob > |z| =   0.2703
```

Question 2

```
Sample      X      N  Sample p
1          32     49  0.653061
2         118    245  0.481633

Estimate for p(1) - p(2):  0.171429
99% CI for p(1) - p(2):  (-0.0220667, 0.364924)
Test for p(1) - p(2) = 0 (vs not = 0):  Z = 2.28  P-Value = 0.022
```